

I Claim:

1. An instrument for measuring the level of a liquid body in a

vessel, comprising:

a first transducer mounted to said vessel at a known distance from
the vessel bottom for transmitting ultrasonic energy through a gaseous medium to
a gas liquid interface of the body and for receiving ultrasonic energy reflected back
from the interface,

a circuit for producing ultrasonic energy that is supplied to said first
transducer and for calculating the height of the liquid body based on the round trip
transit time of the ultrasonic energy from said first transducer to the interface and
the return of the reflected energy and the known distance to the bottom of the
vessel; and

a second transducer set at a predetermined height above the bottom
of the vessel for sensing the presence of liquid in the vessel reaching the
predetermined height.

2. An instrument as claimed in claim 1 further comprising a fixture

on which said first and second transducers are mounted.

3. An instrument as claimed in claim 2 wherein said fixture
comprises a first body portion that passes through a hole in the wall of the vessel

and a main body portion that extends within the vessel.

4. An instrument as claimed in claim 3 wherein said fixture main body portion comprises a first arm extending therfrom inwardly of the vessel, said first transducer mounted to said first arm.

5. An instrument as claimed in claim 4 wherein said fixture main body portion further comprises a second arm extending from inwardly of the vessel, said second transducer mounted to said second arm.

6. An instrument as claimed in claim 5 wherein said second arm is located below said first arm.

7. An instrument as claimed in claim 6 wherein said first arm is located above said second arm and extends further inwardly of the vessel than said second arm.

8. An instrument as claimed in claim 4 wherein said fixture main body portion further comprises a pair of spaced second arms, a said second transducer mounted in each of said pair of second arms.

9. An instrument as claimed in claim 8 wherein said pair of second arms is located below said first arm.

10. An instrument as claimed in claim 9 wherein said first arm extends further inwardly of the vessel than said pair of second arms.

11. An instrument as claimed in claim 8 further comprising a detection circuit connected to said second transducers of said second arms that provides an indication when liquid enters the space between said pair of second arms.

12. An instrument as claimed in claim 11 wherin the indication provided by said detection circuit is oscillation of said detection circuit.

13. An instrument as claimed in claim 2 wherein said circuit further comprises means for detecting the presence of energy reflected from said fixture main body at a time before energy is reflected from the liquid body gas liquid interface received by said first transducer to determine proper operation of said first transducer.

14. An instrument as claimed in claim 11 further comprising means

for connecteing each of said two second transducers together to simulate the presence of liquid in the space between said two second arms and thereby test the operation of said two second transducers.

15. An instrument as claimed in claim 13 further comprising means for connecteing each of said two second transducers together to simulate the presence of liquid in the space between said two second arms and thereby test the operation of said two second transducers.